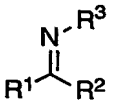
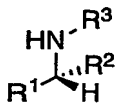
WHAT IS CLAIMED IS:

1. A process for the hydrogenation and/or asymmetric hydrogenation of an imine of Formula (I) to an amine of Formula (II):



I



II

wherein

R^1 is selected from the group consisting of aryl and heteroaryl, which two groups are optionally substituted;

R^2 is selected from the group consisting of hydrogen, aryl, heteroaryl, C_{1-10}alkyl, C_{2-10}alkenyl, C_{2-10}alkynyl, C_{3-10}cycloalkyl, C_{3-10}cycloalkenyl and C_{3-10}heterocyclo, which latter eight groups are optionally substituted; and

R^3 is selected from the group consisting of optionally substituted C_1 to C_2 alkyl and optionally substituted C_{3-10}cycloalkyl;

or R^1 and R^2 or R^2 and R^3 are linked to form an optionally substituted ring;

wherein the optional substituents of R^1 and R^2 are independently selected from one or more of the group consisting of halo, NO_2, OR^4, NR^4_2 and R^4, in which R^4 is independently selected from one or more of the group consisting of hydrogen, aryl, C_{1-6}alkyl, C_{2-6}alkenyl, C_{3-6}cycloalkyl and C_{3-6}cycloalkenyl;

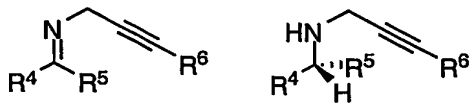
the optional substituents of R^3 are independently selected from one or more of the group consisting of halo, NO_2, OR^5, NR^5_2 and R^5, in which R^5 is independently selected from the group consisting of C_{1-6}alkyl, C_{2-6}alkenyl and C_{2-6}alkynyl; and

one or more of the carbon atoms in the alkyl, alkenyl and/or alkynyl groups of R^1, R^2 and/or R^3 is optionally replaced with a heteroatom selected from the group consisting of

O, S, N, P and Si, which, where possible, is optionally substituted with one or more C_{1-6}alkyl groups,

said process comprising the steps of reacting imines of Formula (I) in the presence of H_2, and a catalytic system in which the catalytic system includes a base and a ruthenium complex comprising (1) a diamine and (2) a diphosphine ligand or monodentate phosphine ligands.

2. A process for the hydrogenation and/or asymmetric hydrogenation of an imine of Formula (III) to an amine of Formula (IV):



III IV

wherein

R^4 and R^5 represent simultaneously or independently hydrogen, aryl, heteroaryl, C_{1-10}alkyl, C_{2-10}alkenyl, C_{2-10}alkynyl, C_{3-10}cycloalkyl, C_{3-10}cycloalkenyl or C_{3-10}heterocyclo, which latter eight groups are optionally substituted, or

R^4 and R^5 are linked together to form an optionally substituted ring;

R^6 is selected from the group consisting of H, aryl, C_{1-10}alkyl, C_{2-10}alkenyl, C_{2-10}alkynyl, C_{3-10}cycloalkyl and C_{3-10}cycloalkenyl, which latter six groups are optionally substituted;

wherein the optional substituents of R^4, R^5 and R^6 are independently selected from one or more of the group consisting of halo, NO_2, OR^7, NR^7_2 and R^7, in which R^7 is independently selected from the group consisting of C_{1-6}alkyl, C_{2-6}alkenyl and C_{2-6}alkynyl; and

one or more of the carbon atoms in the alkyl, alkenyl and/or alkynyl groups of R^4, R^5 and/or R^6 are optionally replaced with a heteroatom selected from the group consisting of

O, S, N, P and Si, which, where possible, is optionally substituted with one or more C_{1-6}alkyl groups,

said process comprising the steps of reacting imines of Formula (III) in the presence of H_2, and a catalytic system in which the catalytic system includes a base and a ruthenium complex comprising (1) a diamine and (2) a diphosphine ligand or monodentate phosphine ligands.

3. The process according to claim 1, wherein the amine of Formula (II) or its opposite enantiomer, is produced in enantiomerically enriched form.

4. The process according to claim 2, wherein the amine of Formula (IV) or its opposite enantiomer, is produced in enantiomerically enriched form.

5. The process according to claim 1 or 3, wherein R^1 is optionally substituted aryl.

6. The process according to claim 5, wherein R^1 is optionally substituted phenyl,

7. The process according to claim 6, wherein R^1 is unsubstituted phenyl.

8. The process according to any one of claims 5-7, wherein R^2 is selected from the group consisting of hydrogen, aryl, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl and C_{3-6}cycloalkenyl, which latter six groups are optionally substituted.

9. The process according to claim 8, wherein R^2 is selected from the group consisting of hydrogen, aryl and C_{1-6}alkyl, which latter two groups are optionally substituted.

10. The process according to claim 9, wherein R^2 is selected from the group consisting of hydrogen, phenyl, and C_{1-6}alkyl, which latter two groups are optionally substituted.

11. The process according to claim 10, wherein R^2 is selected from the group consisting of hydrogen, unsubstituted phenyl and methyl.

12. The process according to any one of claims 5-11, wherein R^3 is selected from the group consisting of optionally substituted C_1 to C_2 alkyl and optionally substituted C_{3-6}cycloalkyl.

13. The process according to claim 12, wherein R^3 is methyl, ethyl, i-propyl, cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl, which latter four groups are unsubstituted.

14. The process according to claims 1 or 3, wherein R^2 and R^3, including the atoms to which they are attached, are linked to form an optionally substituted 5- or 6-membered ring.

15. The process according to claim 14, wherein R^2 and R^3, including the atoms to which they are attached, are linked to form an unsubstituted 5- or 6-membered ring.

16. The process according to any one of claims 5-15, wherein the optional substituents for R^1 and R^2 in the compounds of Formula I, are independently selected from one or more of the group consisting of halo, NO_2, OR^4, NR^4_2 and R^4, in which R^4 is independently selected from one or more of the group consisting of hydrogen, aryl and C_{1-4}alkyl, and the optional substituents of R^3 are independently selected from one or

more of the group consisting of halo, NO_2, OR^5, NR^5_2 and R^5, in which R^5 is independently selected from the group consisting of C_{1-4}alkyl.

17. The process according to claim 16, wherein the optional substituents for R^1 and R^2 in the compounds of Formula I, are independently selected from one or more of the group consisting of halo, NO_2, OH, OCH_3, NH_2, $N(CH_3)_2$, CH_3 and phenyl and the optional substituents of R^3 are independently selected from one or more of the group consisting of halo, NO_2, OH, OCH_3, NH_2, $N(CH_3)_2$ and CH_3.

18. The process according to any one of claims 5-17, wherein one to three of the carbon atoms in the alkyl, alkenyl and/or alkynyl groups of R^1, R^2 and/or R^3 is optionally replaced with a heteroatom selected from the group consisting of O, S, N, NH and N-CH_3.

19. The process according to claim 18, wherein suitably one of the carbon atoms in the alkyl, alkenyl and/or alkynyl groups of R^1, R^2 and/or R^3 is optionally replaced with a heteroatom selected from the group consisting of O, S, N, NH and N-CH_3.

20. The process according to claim 2 or 4, wherein R^4 and R^5 represent simultaneously or independently hydrogen, aryl, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl or C_{3-6}cycloalkenyl, which latter six groups are optionally substituted.

21. The process according to claim 20, wherein R^4 and R^5 represent simultaneously or independently hydrogen, aryl or C_{1-6}alkyl, which latter two groups are optionally substituted.

22. The process according to claim 21, wherein R^4 and R^5 represent simultaneously or independently hydrogen, phenyl, and C_{1-6}alkyl, which latter two groups are optionally substituted.

23. The process according to claim 22, wherein R^4 and R^5 represent simultaneously or independently hydrogen, unsubstituted phenyl or methyl.

24. The process according to claim 2 or claim 4, wherein R^4 and R^5, including the atoms to which they are attached, are linked to form an optionally substituted, suitably unsubstituted, 5- or 6-membered ring.

25. The process according to any one of claims 20-24, wherein R^6 is selected from the group consisting of H, aryl, C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl and C_{3-6}cycloalkenyl, which latter six groups are optionally substituted.

26. The process according to claim 25, wherein R^6 is selected from the group consisting of H and C_{1-4}alkyl.

27. The process according to claim 26, wherein R^6 is H.

28. The process according to any one of claims 20-27, wherein the optional substituents for R^4, R^5 and R^6, are independently selected from one or more of the group consisting of halo, NO_2, OR^7, NR^7_2 and R^7, in which R^7 is independently selected from one or more of the group consisting of C_{1-4}alkyl.

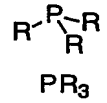
29. The process according to claim 28, wherein the optional substituents for R^4, R^5 and R^6 in the compounds of Formula III, are independently selected from one or more of the group consisting of halo, NO_2, OH, OCH_3, NH_2, $N(CH_3)_2$ and CH_3,

30. The process according to any one of claims 20-29, wherein one to three, of the carbon atoms in the alkyl, alkenyl and/or alkynyl groups of R^4, R^5 and/or R^6 is optionally replaced with a heteroatom selected from the group consisting of O, S, N, NH and N-CH_3.

31. The process according to claim 30, wherein one of the carbon atoms in the alkyl, alkenyl and/or alkynyl groups of R^4, R^5 and/or R^6 is optionally replaced with a heteroatom selected from the group consisting of O, S, N, NH and N-CH_3.

32. The process according to any one of claims 1 to 31, wherein said ruthenium complex has the general Formula $RuXY(PR_3)_2(NH_2\text{-}Z\text{-}NH_2)$ (III) or $RuXY(R_2P\text{-}Q\text{-}PR_2)(NH_2\text{-}Z\text{-}NH_2)$ (IV), where Z and Q represent a chiral or achiral linker; the ancilliary ligands PR_3 and $R_2P\text{-}Q\text{-}PR_2$ represent monodentate and bidentate phosphines, respectively; and the ligands X and Y represent an anionic ligand.

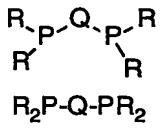
33. The process according to claim 32, wherein the ligand PR_3 :



represents a chiral or achiral monodentate phosphine ligand in which R is simultaneously or independently selected from the group consisting of optionally substituted linear and branched alkyl containing 1 to 8 carbon atoms, optionally substituted linear and

branched alkenyl containing 2 to 8 carbon atoms, optionally substituted cycloalkyl, optionally substituted aryl, OR and NR_2; or two R groups bonded to the same P atom are bonded together to form a ring having 5 to 8 atoms and including the phosphorous atom to which said R groups are bonded.

34. The process according to claim 32, wherein the ligand R_2P-Q-PR_2:

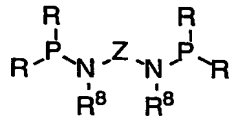


represents a bidentate ligand in which R is simultaneously or independently selected from the group consisting of optionally substituted linear and branched alkyl containing 1 to 8 carbon atoms, optionally substituted linear and branched alkenyl containing 2 to 8 carbon atoms, optionally substituted cycloalkyl, optionally substituted aryl, OR and NR_2; or two R groups bonded to the same P atom are bonded together to form a ring having 5 to 8 atoms and including the phosphorous atom to which said R groups are bonded; and Q is selected from the group consisting of linear and cyclic C_2-C_7 alkylene, optionally substituted metallocenediyl and optionally substituted C_6-C_{22} arylene.

35. The process according to claim 34, wherein the ligand R_2P-Q-PR_2 is chiral and includes atropisomeric bis-tertiary phosphines, in which the two phosphorus atoms are linked by a biaryl backbone.

36. The process according to claim 35, wherein the ligand R_2P-Q-PR_2 is selected from the group consisting of BINAP, BIPHEP and BIPHEMP.

37. The process according to claim 32, wherein the bidentate phosphine is a chiral or achiral ligand of the type $R_2P\text{-}NR^8\text{-}Z\text{-}NR^8\text{-}PR_2$:

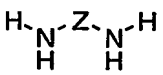


$R_2P\text{-}NR^8\text{-}Z\text{-}NR^8\text{-}PR_2$

wherein each R, taken separately, is independently selected from the group consisting of optionally substituted linear and branched alkyl containing 1 to 8 carbon atoms, optionally substituted linear and branched alkenyl containing 2 to 8 carbon atoms, optionally substituted cycloalkyl, optionally substituted aryl, OR and NR_2; or two R groups bonded to the same P atom are bonded together to form a ring having 5 to 8 atoms and including the phosphorous atom to which said R groups are bonded; each R^8, taken separately, is independently selected from the group consisting of hydrogen, optionally substituted linear and branched alkyl and alkenyl containing 1 to 8 carbon atoms, optionally substituted cycloalkyl, optionally substituted aryl, OR and NR_2; and Z is optionally substituted linear and cyclic C_2-C_7 alkylene, optionally substituted metallocenediyl and optionally substituted C_6-C_{22} arylene.

38. The process according to claim 37, wherein the ligand $R_2P\text{-}NR^8\text{-}Z\text{-}NR^8\text{-}PR_2$ is selected from the group consisting of DPPACH and DCYPPACH.

39. The process according to any one of claims 1 to 38, wherein the diamine ligand has the Formula $NH_2\text{-}Z\text{-}NH_2$:



$NH_2\text{-}Z\text{-}NH_2$

wherein Z is selected from the group consisting of optionally substituted linear and cyclic C_2-C_7 alkylene, optionally substituted metallocenediyl and optionally substituted C_6-C_{22} arylene.

40. The process according to claim 39, wherein the diamine ligand is chiral and includes (1) compounds in which at least one of the amine-bearing centers is stereogenic, (2) compounds in which both of the amine-bearing centers are stereogenic and (3) atropisomeric bis-tertiary diamines, in which the two nitrogen atoms are linked by a biaryl backbone.

41. The process according to claim 39, wherein the diamine ligand NH_2-Z-NH_2 is selected from the group consisting of CYDN and DPEN.

42. The process according to any one of claims 1 to 38, wherein the diamine is a bidentate ligand of the Formula D-Z-NHR^9 in which Z is selected from the group consisting of optionally substituted linear and cyclic C_2-C_7 alkylene, optionally substituted metallocenediyl and optionally substituted C_6-C_{22} arylene; D is an amido group donor or a chalcogenide radical selected from the group consisting of O, S, Se and Te; NHR^6 is an amino group donor in which R^9 is selected from the group consisting of hydrogen, optionally substituted linear and branched alkyl and alkenyl containing 1 to 8 carbon atoms, optionally substituted cycloalkyl and optionally substituted aryl.

43. The process according to claim 42, wherein D is NR^{10}, wherein R^{10} is selected from the group consisting of $S(O)_2R^{10}$, $P(O)(R^{10})_2$, $C(O)R^{10}$, $C(O)N(R^{10})_2$ and $C(S)N(R^{10})_2$, in which R^{10} is independently selected from the group consisting of hydrogen, optionally substituted linear and branched alkyl and alkenyl containing 1 to 8 carbon atoms, optionally substituted cycloalkyl and optionally substituted aryl.

44. The process according to claim 42, wherein the diamine is chiral and includes (1) compounds in which the amine-bearing center is stereogenic, (2) compounds in which both the donor-bearing (D) and amine-bearing centers are stereogenic.

45. The process according to claim 44, wherein the diamine is $CH_3C_6H_4SO_3NCHPhCHPhNH_2$.

46. The process according to any one of claims 1 to 45, wherein the ligands X and Y is selected from the group consisting of Cl, Br, I, H, hydroxy, alkoxy and acyloxy.

47. The process according to any one of claims 1 to 46, wherein the base is an alcoholate or an hydroxide salt selected from the group consisting of compounds of the Formula $(R^{12}O)_2M'$ and $R^{12}OM''$, in which M' is an alkaline-earth metal, M'' is an alkaline metal and R^{12} is selected from the group consisting of hydrogen, C_1 to C_6 linear and branched alkyl.

48. The process according to any one of claims 1-47, wherein the base is an organic non-coordinating base.

49. The process according to claim 48, wherein the base is selected from the group consisting of DBU, NR_3 and phosphazene.

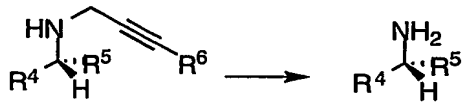
50. The process according to any one of claims 1 to 49, wherein the hydrogenation is carried out in the absence of a solvent.

51. The process according to any one of claims 1 to 49, wherein the hydrogenation reaction is carried out in the presence of a solvent.

52. The process according to claim 51, wherein the solvent is selected from the group consisting of benzene, toluene, xylene, hexane, cyclohexane, tetrahydrofuran, primary and secondary alcohols, and mixtures thereof.

53. The process according to claim 51, wherein the hydrogenation is carried out in an amine solvent.

54. A process for the preparation of amines of Formula V from the amine of the Formula IV, or the opposite enantiomer thereof:



IV V

wherein R^4, R^5 and R^6 are as defined in any one or claims 2, 4 and 20-31, comprising reacting compounds of Formula IV under conditions for the selective removal of the CH_2-C≡C-R^6 group.

55. The process according to claim 54, wherein the conditions for the selective removal of the CH_2-C≡C-R^6 group comprise $TiCl_3$ and lithium.

56. The process according to claim 54 or 55 wherein the compound of Formula IV is enantiomericly enriched.